

CHAPTER 10

MANUFACTURED PLAY EQUIPMENT

10-1. Introduction.

Manufactured play equipment (MPE) components should be designed as one part of a comprehensive multipurpose play area. Isolated pieces of play equipment alone do not address children's developmental needs. Most MPE stimulates gross motor and sensory development. However, properly selected play equipment can also support the non-physical aspects of child development. New designs are now beginning to address the safety and development of children under age 5, children over age 10, and those with disabilities. This chapter describes safety and accessibility guidelines for manufactured equipment and specific play events. A list of play events that are not recommended for unsupervised children's outdoor play areas is provided. Guidelines for composite structures and recommended composite structure layouts are included.

10-2. Freestanding and Composite Structure Play Events.

Many play events may be installed as freestanding equipment or may be attached to a composite structure. A composite structure consists of two or more play events that are attached or functionally linked to create one integral unit that provides multiple play activities. When play equipment emphasizes large muscle activity, a composite structure is preferable to isolated pieces. When equipment supports quiet social activity, such as playhouses or game panels, separate equipment in a low activity location may be preferred. Child safety also determines play equipment layout. For example, to-fro swings must be located at the edge of the play area and not be attached to composite structures to minimize injuries that occur when children run in front of swings. Table 10-1 lists play events and identifies those that may be installed as freestanding structures and those that may be installed as composite structures.

10-3. Safety Guidelines for Manufactured Play Equipment.

All manufactured equipment will meet general SC, ASTM F 1487, and this manual. A playground safety surface that meets the requirements of ASTM F 1292 for the highest accessible height of the equipment should be installed over ground surfaces throughout the equipment use zone.

Table 10-1. Freestanding and Composite Structure Play Events.

Play Event	Freestanding Structures	Composite Structures
Balance beam	X	X
Banister slide		X
Chinning/turning bar	X	X
Clatter bridge	X	X
Climber	X	X
Climber - arch	X	X
Climber - net	X	X
Fire pole		X
Game panel	X	X
Horizontal ladder	X	X
Parallel bars	X	X
Playhouse	X	X
Ring trek	X	X
Sand table	X	X
Slide	X	X
Spring rocking equipment	X	
Stationary bridge	X	X
Swing - to-fro	X	
Swing - rotating	X	
Track ride	X	X
Tunnel	X	X

X Appropriate installation.

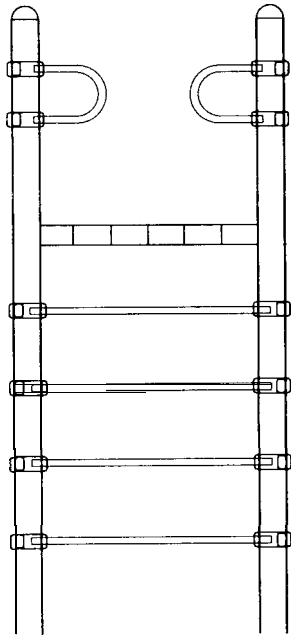
10-4. Structural Integrity.

ASTM has developed test procedures that measure the load-bearing capacity of manufactured play equipment. It is the responsibility of manufacturers to conduct these tests on equipment. Before specifying equipment, written verification should be obtained from the manufacturer that the play equipment was tested in accordance with ASTM F 1487 and meets all standards for structural integrity.

10-5. Ladders, Stairways, and Ramps (Not for Wheelchair Use).

Ladders, stairways, and ramps are commonly used to provide access to and egress from play equipment. Equipment access and egress methods vary in difficulty. The level of challenge provided will be appropriate to the user's age group.

a. Rung Ladder Rung ladders have a rounded crosspiece that supports the user's feet or is grasped by the user's hands (fig 10-1).



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Figure 10-1. Rung Ladder

b. Step Ladder Step ladders have a flat horizontal crosspiece used as a foot support (fig 10-2).

c. Stairway. Stairways consist of a series of steps used primarily as a foot support (fig 10-3). Stairways may have open or closed risers, depending on the age group served. Stairways may be straight or spiral around a central point.

d. Ramp Not for Wheelchair Use. A ramp is a sloping surface less than or equal to 1:8 that provides access between levels by walking or crawling (fig 10-4). Wheelchair accessible ramps will meet guidelines provided in this chapter for ramps intended for wheelchair play equipment access.

e. Recommended Ages. Easy and more challenging access methods should be provided for all age groups. Stairways are one of the easiest play equipment entrances. Ramps are also suitable for both younger and older children. Step ladders and rung ladders are more challenging. Rung ladders should not be provided as the sole means of equipment access for children under 5 years.

(1) *Ages 18 to 24 Months.* Ramps or stairways with closed risers should be provided.

(2) *Ages 2 to 5 Years.* Ramps or stairways with closed risers should be provided. Open risers with the appropriate step height for this age group create a potential head and neck entrapment. Rung ladders and step ladders may be provided if a less difficult means of access and egress is also included

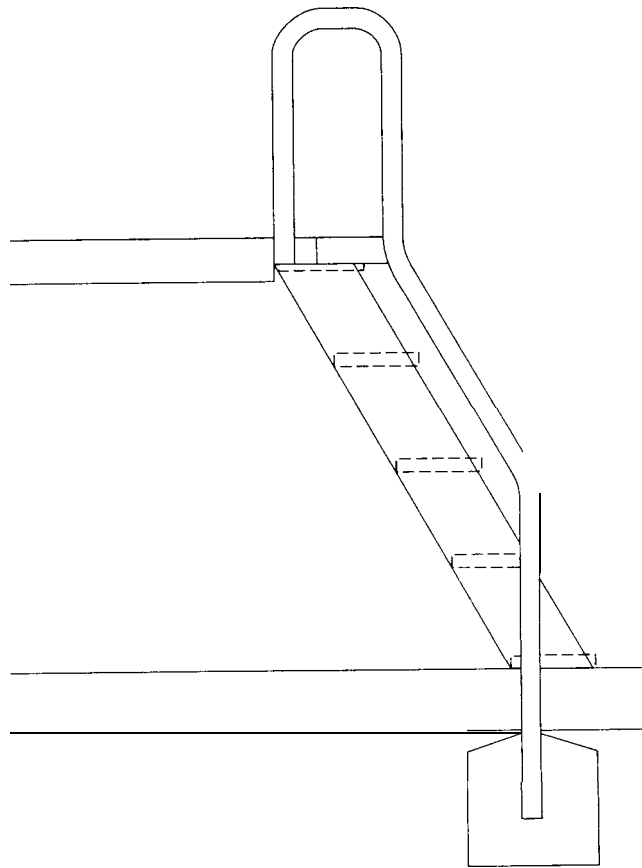


Figure 10-2. Step Ladder.

(3) *Ages 5 to 12 Years.* Rung or step ladders, stairways with open risers, spiral stairways with open risers, and ramps may be provided.

f. Steps and Rungs. Steps and rungs designed to minimize slipping and tripping should be selected.

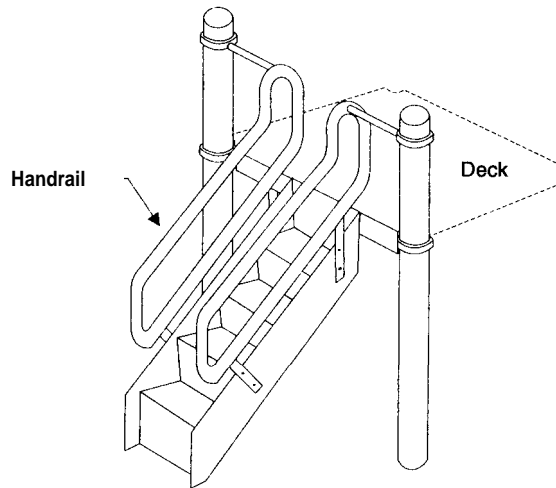
g. Handrail. Handrails provide balance and support during equipment access and egress. For rung ladders, the vertical support posts and horizontal rungs provide hand support. Therefore, handrails are not required for rung ladders.

10-6. Transition to Platform.

Handrails and other handgripping devices provide hand support and balance as children move from platforms, play events, ladders, stairways, and ramps to platforms. Evenly spaced rungs and steps help ease the transition to platforms.

10-7. Platforms and Play Surfaces.

Platforms, landings, walkways, ramps, and other transitional play surfaces that reduce slipping and tripping should be selected. Surface materials that will not cut, scratch, or burn when slid upon, such as metal covered with a PVC coating, should be selected.



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Figure 10-3. Stairway.

10-8. Stepped Platform.

Graduated platforms may be used in the transfer system alone or in conjunction with a system of steps and platforms (fig 10-5) to transfer from a wheelchair onto play equipment.

10-9. Ramp Intended for Wheelchair Access.

Ramps intended for wheelchair play equipment access, which are 1500 mm (60 inches) wide or greater, should meet accessibility standards for adults with the exception of the handrail requirements described below (fig 10-6). Ramps which are 1500 mm (60 inches) wide or less should meet accessibility standards for adults with the following exceptions.

a. Maximum Cross Slope. The ramp cross slope will be a maximum of 1:50.

b. Ramp Length. The maximum ramp run or length will not exceed 3600 mm (12 feet).

c. Landing Dimensions. The bottom and top of the ramp run will be a minimum of 1500 mm (60 inches) in diameter. Landings which contain play events will include a minimum of 750 mm by 1200 mm (30 inches by 48 inches) clear space where a wheelchair user may park and play. A parked wheelchair will not reduce the adjacent circulation path to less than 900 mm (36 inches).

d. Parking Spaces at Elevated Play Events. Where ramp access is provided to an elevated play event, wheelchair parking spaces may overlap turning spaces.

e. Edge Protection. Edges of ramps and landing will have a means of preventing wheelchairs from falling off the landing.

f. Handrail Height. Handrails will be provided on each side of the ramp at 650 mm to 700 mm (26 inches to 28 inches) above the ramp surface.

10-10. Transfer Point.

A transfer point is a platform along an accessible route of travel that allows a wheelchair user to transfer from a wheelchair onto the play equipment (fig 10-7). The transfer point and adjacent stepped platforms or steps that allow a child to move through the equipment is called the transfer system.

a. Height of Transfer Point. For children 2 to 5 years old, the transfer point will be provided at a height of 275 to 350 mm (11 to 14 inches) above the accessible route of travel or the wheelchair accessible platform. For children 5 to 12 years old, the transfer point will be provided at a height of 350 to 425 mm (14 to 17 inches) above the accessible route of travel or the wheelchair accessible platform.

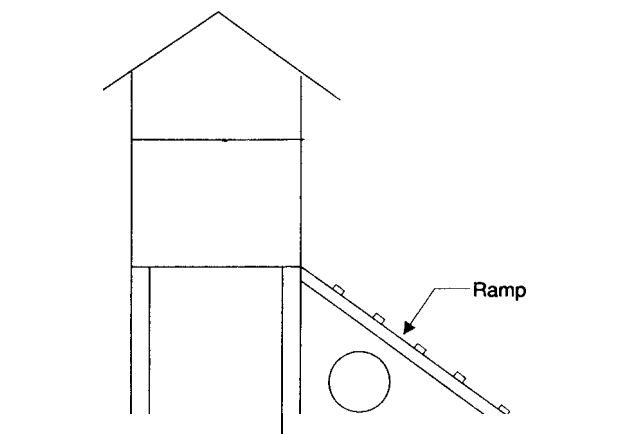
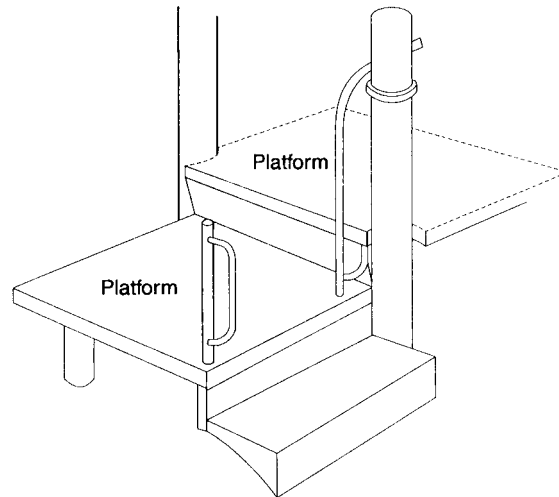
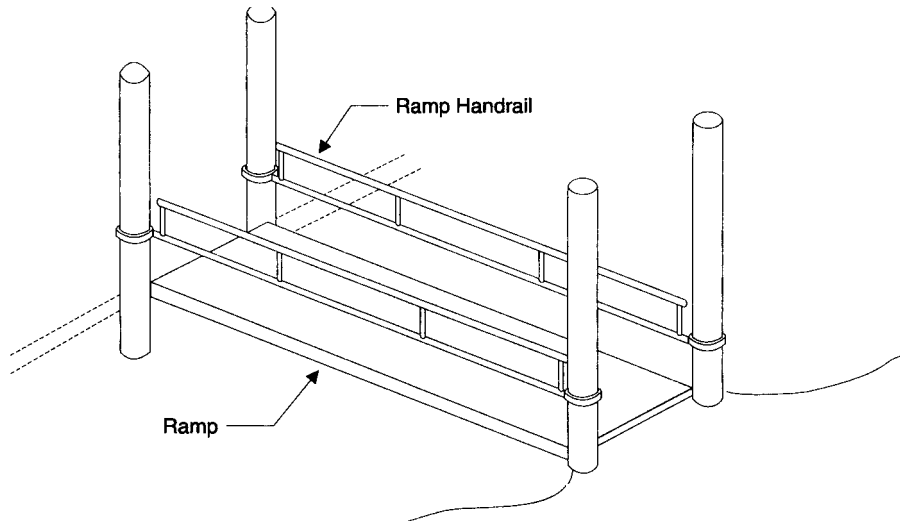


Figure 10-4. Ramp Not for Wheelchair Use.



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Figure 10-5. Stepped Platform.



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Figure 10-6. Ramp for Wheelchair Play Equipment Access.

b. Size of Deck. The minimum clear width of the deck used in the transfer system will be 600 mm (24 inches) and the minimum depth of the platform will be 350 mm (14 inches).

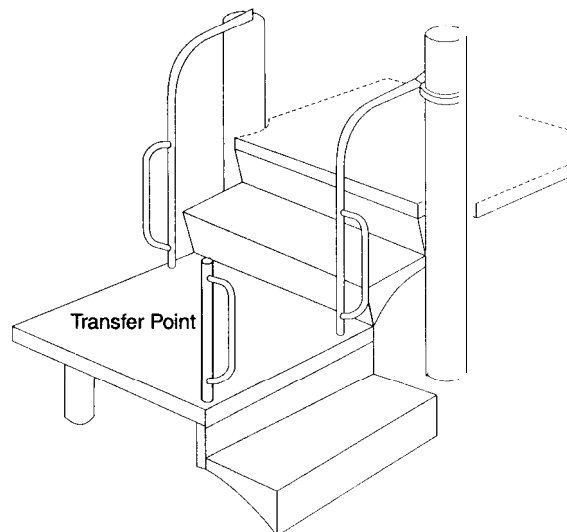
c. Grab Bars or Hand Holds. A grab bar or hand hold will be provided to assist a child in transferring.

d. Steps or Platforms Adjacent to Transfer Point. Steps or platforms, adjacent to the transfer platform, that are used to move through the equipment will be fully enclosed. A maximum step height of 150 mm (6 inches) for children under 5 years old and a maximum step height of 200 mm (8 inches) for children over 5 years old will be provided.

e. Wheelchair Parking Area. A parking area, a minimum of 750 mm by 1200 mm (30 inches by 48 inches), adjacent to the transfer platform off of the accessible route of travel will be provided. It will accommodate one wheelchair.

(1) *Turning Space.* A turning space will be provided at the base of the transfer platform and off of the accessible path of travel. The turning space will provide a clear space of 1500 mm (60 inches) in diameter or a T-shaped area. The turning space and parking space may overlap.

(2) *Circulation Path.* The Parking space at the transfer point will not reduce the circulation path to less than 900 mm (36 inches).



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Figure 10-7. Transfer System.

(3) *Additional Wheelchair* Additional 750 mm by 1200 mm (30 inches by 48 inches) parking spaces that meet these requirements may be provided if necessary.

10-11. Recommended Play Events.

Play events recommended for unsupervised children's outdoor play areas are described below. This description includes the appropriate user age groups, safety guidelines specific to the play event, use zone requirements, adaptations for children with disabilities, and required maintenance level. The description identifies whether each event should be installed as freestanding equipment or as part of a composite structure.

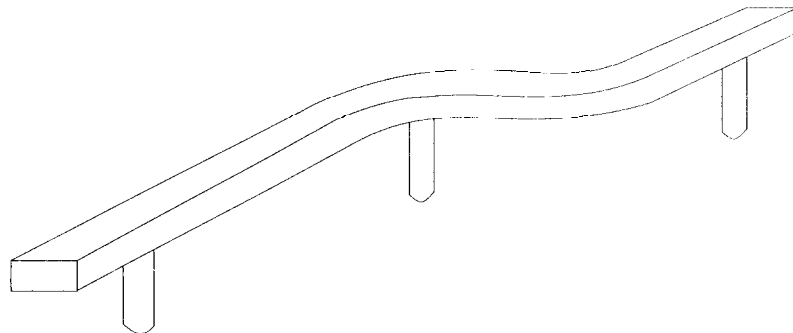
10-12. Balance Beam.

A balance beam is a stationary or suspended beam designed to develop balance and coordination as children walk across it or balance on it (fig 10-8). It may be used as freestanding equipment or be attached to a composite structure.

a. Recommended Ages. Stationary beams are recommended for children ages 2 through 12 years, Suspended beams are recommended for children ages 5 through 12 years.

b. Trip Hazards. Balance beam support posts that extend above the level of the walking surface and create a trip hazard will not be provided.

c. Use Zone. A minimum 1800 mm (72-inch) use zone extending from all sides of the equipment will



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Figure 10-8. Balance Beam

be provided. Two balance beams under 500 mm (20 inches) high may have overlapping use zones (fig 10-9).

d. Adaptations for Children With Disabilities. For children with perceptual problems, a brightly colored beam that contrasts with the safety surface should be selected.

e. Maintenance Level. The level of maintenance required for this play equipment is low.

10-13. Banister Slide.

A banister slide is a sliding pole that extends at an angle from the platform of a composite structure (fig 10-10). Children use the slide by straddling the pole. The activity is similar to sliding down a stair

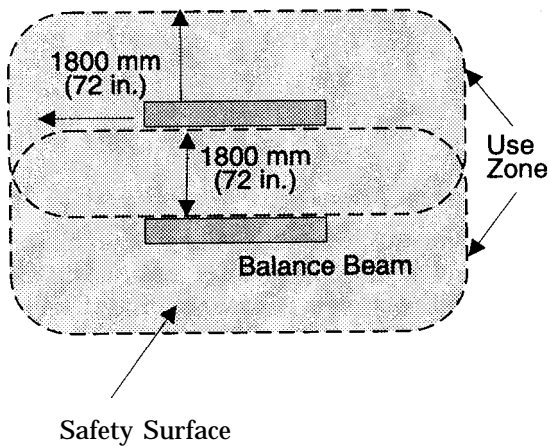


Figure 10-9. Two Balance Beams With (Overlapping Use Zones).

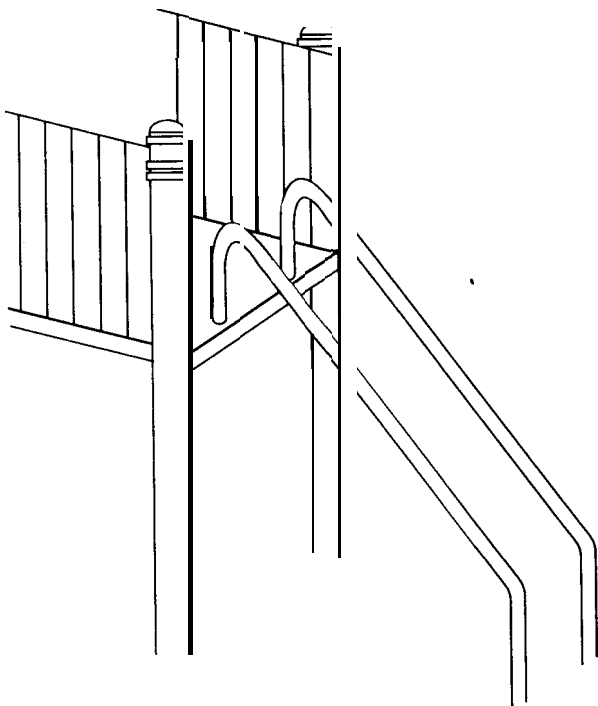


Figure 10-10 Banister Slide.

way banister. Banister slides should be attached to a composite structure. The slide should not be installed as freestanding equipment.

a. Recommended Ages. Banister slides are recommended for children ages 5 through 12 years. The equipment is not recommended for children under 5 years.

b. Safety Guidelines.

(1) Maximum Height of Attached Platform. The banister slide will be attached to a composite structure platform at a maximum height of 1400 mm (56 inches).

(2) Pole Diameter. The maximum pole diameter should be 50 mm (1-9/10 inches).

(3) Pole Surface. A pole with a smooth, continuous surface will be provided. Bolts or seams should not be allowed to protrude along the sliding surface.

c. Use Zone. A minimum 2400 mm (96-inch) use zone will be provided from all sides of the equipment.

d. Adaptations for Children With Disabilities. This activity is not readily accessible to children with mobility limitations because of strength and recovery requirements. Children with visual limitations may need assistance in recovery and dismounting.

e. Maintenance Level. The level of maintenance required for this play equipment is moderate.

10-14. Chinning and Turning Bar.

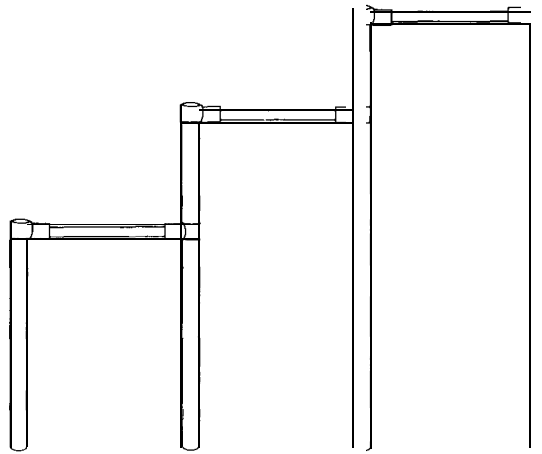
This play event consists of a horizontal bar supported by vertical posts (fig 10-11). It is used to develop upper body strength. Younger children strengthen muscles by hanging or swinging on the bars while supported by hands and arms. Older children may use the bar for pull-ups or turning somersaults. This equipment may be freestanding or be attached to a composite structure.

a. Recommended Ages. Chinning and turning bars are recommended for children ages 2 through 12 years.

b. Minimum Bar Height. A bar height that allows safe use when children are turning or hanging from bent knees should be provided. For children ages 2 to 5 years, a minimum bar height of 900 mm (36 inches) will be provided. For children ages 5 to 12 years, a minimum bar height of 1200 mm (48 inches) will be provided. The bar height should be measured from the center of the grasping device to the safety surface.

c. Use Zone. A minimum 2400 mm (96-inch) use zone from all sides of the equipment will be provided.

d. Adaptations for Children With Disabilities. The bars may be installed at heights appropriate for



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Figure 10-11. Chinning and Taming Bar

children in wheelchairs. For wheelchair users, a maximum bar height of 1300 mm (54 inches) is recommended.

e. Maintenance Level. The level of maintenance required for this play equipment is low.

10-15. Clatter Bridge.

A clatter bridge is a moving bridge between two land areas or two platforms (fig 10-12). Although it may be used as freestanding equipment, it is typically part of a composite structure,

a. Recommended Ages. A clatter bridge is recommended for children ages 3 through 12 years.

b. Safety Guidelines

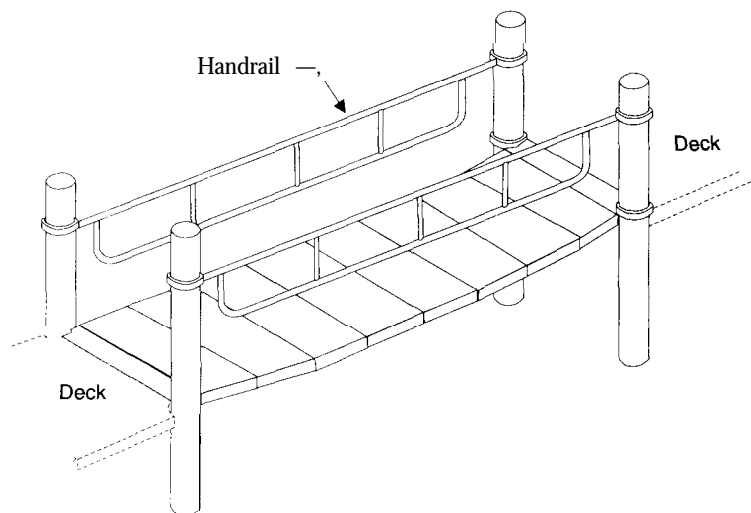
(1) Maximum Distance Between the Bridge and Attached Platforms. The bridge and attached plat-

forms will be located at a maximum of 50 mm (2 inches) apart.

(2) Maximum Bridge Height. For children ages 2 to 5 years, the clatter bridge surface will be located at a maximum height of 750 mm (30 inches) above the safety surface. For 5 to 12 years, the clatter bridge surface will be located at a maximum height of 1200 mm (48 inches).

(3) Guardrails. Guardrails that meet the requirements of ASTM F 1487 will be provided to help prevent children from falling from the clatter bridge surface.

c. Use Zone. A minimum 2400 mm (96-inch) use zone from all sides of the equipment will be provided.



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Figure 10-12 Clatter Bridge.

d. Adaptations for Children With Disabilities. Moving play events are difficult for children with balance problems. The traditional clatter bridge design, based on planks connected by chain, is not accessible to children in wheelchairs. A new flush-mounted design is available that is wheelchair-accessible. Children with physical disabilities may also scoot or crawl across the bridge.

e. Maintenance Level. The level of maintenance required for this play equipment is moderate.

10-16. Climber.

A variety of climber designs are available. This paragraph provides guidelines for climbers composed of rungs (fig 10-13). Rung climbers may be freestanding structures or be attached to a composite structure. When attached to a composite structure, the climber provides a challenging means of equipment access and egress. Platform-type climbers will meet guidelines for composite structures.

a. Recommended Ages. Climbers are recommended for children ages 4 through 12 years.

b. Safety Guidelines.

(1) Composite Structure Access. Climbers will not be used as the sole means of composite structure access and egress. A less challenging means of entry and exit should be provided, such as stairways or stepped platforms. Climbers that provide hand support during climbing and at the transition point where the climber connects to the composite structure platform should be selected.

(2) Maximum Height When Attached to Composite Structure. For 4- to 5-year-olds, climbers with a maximum height of 1200 mm (40 inches) will be provided. For 5- to 12-year-olds, climbers with a maximum height of 1400 mm (56 inches) will be provided.

(3) Maximum Height of Freestanding Climbers. For 4- to 12-year-olds, climbers with a maximum height of 1500 mm (60 inches) will be provided.

(4) Free Fall Design. All climbers will have a free fall design. Climbers that have interior climbing bars that could be struck during a free fall from a height greater than 450 mm (18 inches) to the surface (fig 10-14) will not be provided.

c. Use Zone. A minimum 2400 mm (96-inch) use zone from all sides of the equipment will be provided.

d. Adaptations for Children With Disabilities. Children who use wheelchairs may be able to pull up to a standing position while holding onto this equipment.

e. Maintenance Level. The level of maintenance required for this play equipment is low.

10-17. Climber-Arch.

An arch climber consists of two arched supports connected by horizontal rungs (fig 10-15). The arch climber allows children to climb and hang from the structure in a variety of ways. Arch climbers may be freestanding structures or attached to composite play equipment. When attached to a composite structure, the arch climber provides a challenging method of equipment access and egress.

a. Recommended Ages. Arch climbers are recommended for children ages 4 through 12 years. Freestanding arch climbers should not be used by children under 4 years.

b. Safety Guidelines.

(1) Composite Structure Access. Arch climbers will not be used as the sole means of composite structure access and egress. A less challenging means of entry and exit, such as stairways or stepped platforms should also be provided. Arch

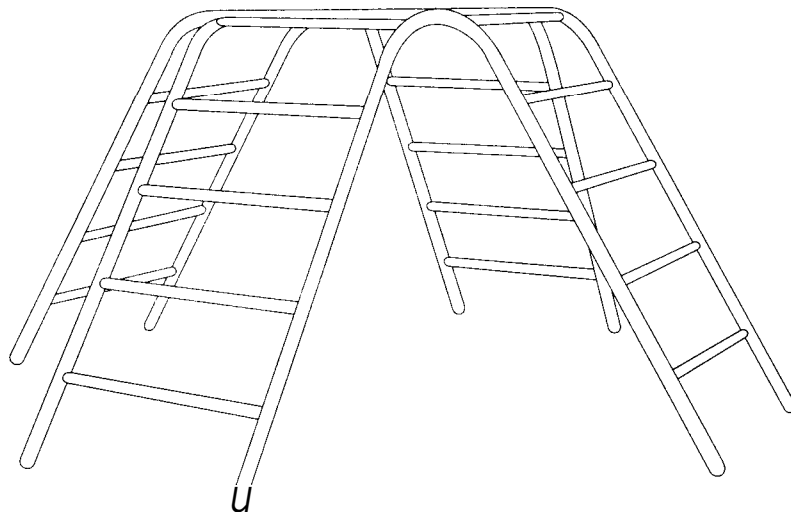


Figure 10-13. Climber Composed of Rungs

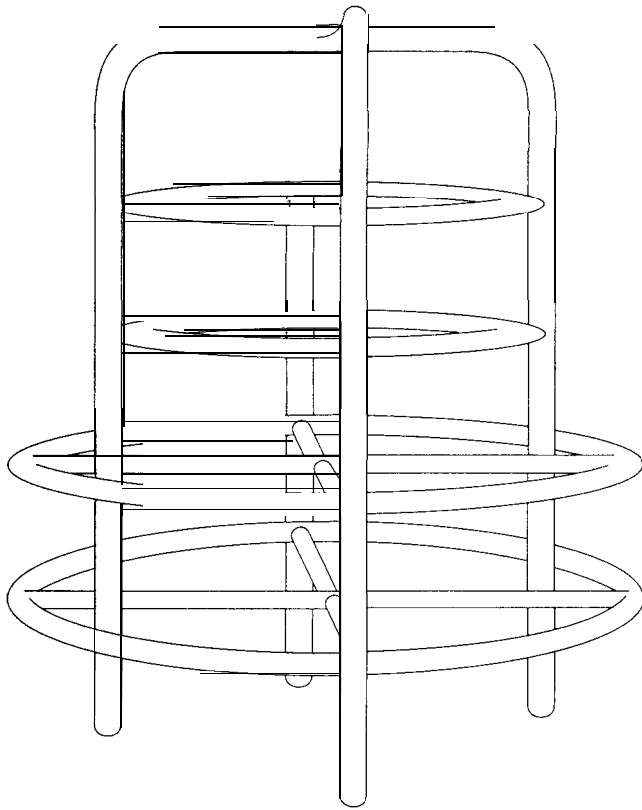


Figure 10-14 Climber With interior Bars

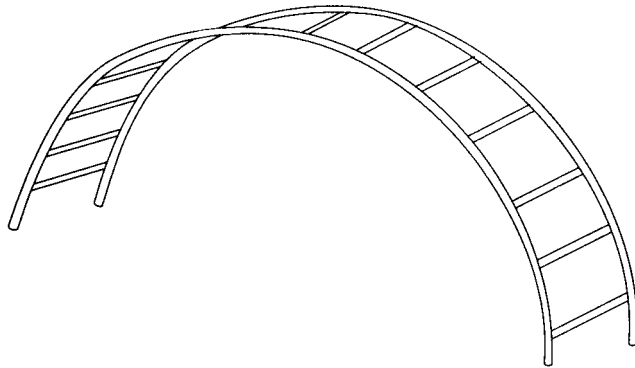


Figure 10-15. Arch Climber.

climbers that provide hand support during climbing and at the transition point where the climber connects to the composite structure platform should be selected

(2) *Minimum Width of Rungs.* Climber rungs will be a minimum 400 mm (16 inches) wide.

(3) *Maximum Height of Arch When Attached to Composite Structure.* For 4- to 5-year-olds, arch climbers with a maximum height of 1200 mm (48 inches) will be provided. For 5- to 12-year-olds, arch climbers with a maximum height of 1500 mm (56 inches) will be provided.

(4) *Maximum Height of Freestanding Arch Climbers.* For 5- to 12-year-olds, arch climbers with

a maximum height of 1500 mm (60 inches) will be provided.

(5) *Free Fall Design.* All climbers should have a free fall design. Climbers that have interior climbing bars that could be struck during a free fall from a height greater than 450 mm (18 inches) to the surface will not be provided.

c. *Use Zone.* A minimum 2400 mm (96-inch) use zone will be provided from all sides of the equipment.

d. *Adaptations for Children With Disabilities.* Children who use wheelchairs may be able to pull themselves up to a standing position while holding onto this equipment. Children with mobility limitations may pass under it.

e. *Maintenance Level.* The level of maintenance required for this play equipment is low.

10-18. Climber-Net.

Net climbers are flexible climbing equipment composed of cable, or chain (fig 10-16). Tire climbers should not be provided. Tires collect glass, trash, water, and harbor insects. Tire climbers are difficult to climb because of large, uneven distances between footholds. Climbers composed of cable are preferred over chain climbers. Cable climbers may be provided as freestanding equipment or may be attached to a composite structure. Net climbers will not be used as the sole means of composite structure access. A less challenging method of access and egress, such as stairways or stepped platforms, should be provided in addition to climbers.

a. *Recommended Ages.* Net climbers are recommended for children ages 3 through 12 years. For children under 5, net climbers composed of cable should be selected. For children ages 5 and older, net climbers composed of chain or cable may be selected.

b. Safety Guidelines.

(1) *Minimum Cable Diameter* For ease of gripping, a minimum cable diameter of 25 mm (1-inch) after coating will be provided.

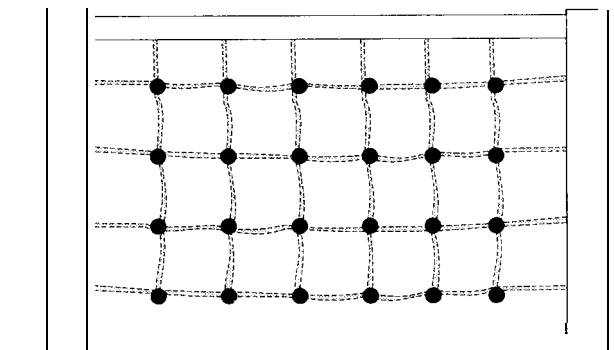


Figure 10-16. Net Climber

(2) *Slope.* For children ages 3 to 5 years, net climbers with a slope of 90° from the safety surface will be selected. For children ages 5 and older, net climbers with a slope of 60° or 90° from the safety surface will be selected.

(3) *Maximum Height.* Net climbers installed at 90° will have a maximum height of 2400 mm (96 inches). Net climbers installed at 60° will have a maximum height of 1400 mm (56 inches).

c. *Use Zone.* A minimum 2400 mm (96-inch) use zone from all sides of the equipment will be provided.

d. *Adaptations for Children With Disabilities.* Children who use wheelchairs and have upper body strength can pull themselves up by holding onto the equipment.

e. *Maintenance Level.* The level of maintenance required for this play equipment is high.

10-19. Fire Pole.

A fire pole is a vertical pole used as a sliding surface that is attached to the platform of a composite structure (fig 10-17). Children slide down the pole to the safety surface while gripping the pole with both arms and legs. Fire poles will be attached to a composite structure. The pole will not be installed as freestanding equipment.

a. *Recommended Ages.* Fire poles are recommended for children ages 5 through 12 years. The equipment is not recommended for children under 5 years.

b. *Safety Guidelines.*

(1) *Maximum Height of Attached Platform.* The fire pole will be attached to a composite structure platform that is a maximum height of 1400 mm (56 inches).

(2) *Access to the Fire Pole.* The space below the fire pole transition platform will be designed to prevent entrance from beneath the equipment into the fire pole use zone.

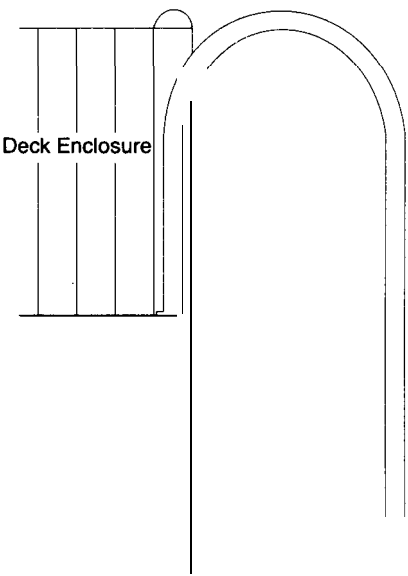
c. *Use Zone.* A minimum 2400 mm (96-inch) use zone will be provided from all sides of the equipment.

d. *Adaptations for Children With Disabilities.* This activity is not readily accessible to children with mobility limitations because of strength and recovery requirements. Children with visual limitations may need assistance in recovery and dismounting.

e. *Maintenance Level.* The level of maintenance required for this play equipment is moderate.

10-20. Game Panel.

Game panels are vertical surfaces that include a game, manipulative play event, or other play activity (fig 10-18). Game panels may be provided as



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Figure 10-17. Fire Pole.

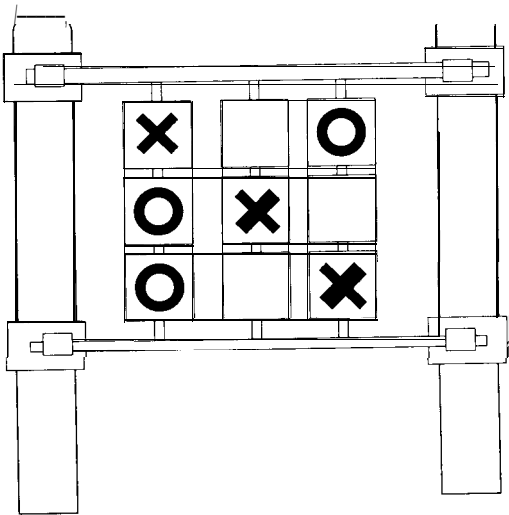


Figure 10-18. Game Panel.

freestanding equipment. As part of a composite structure, game panels can be used as a protective barrier or used as a ground-level play event.

a. *Recommended Ages.* Game panels are recommended for children of all ages.

b. *Safety Guidelines.* For infants to 2 years, game panels will be provided that are a minimum height of 500 mm (20 inches) when used as protective barriers. For children ages 2 to 5 years, game panels will be provided that are a minimum height of 725 mm (29 inches) when used as protective barriers. For children ages 5 to 12 years, game panels will be provided that are a minimum height of 950 mm (38 inches) when used as protective barriers.

c. Use Zone. For infant to 2 years, a minimum 1800 mm (72-inch) use zone from all sides of the equipment will be provided. For children ages 2 through 12 years, a minimum 2400 mm (96-inch) use zone from all sides of the equipment will be provided.

d. Adaptations for Children With Disabilities. Games that incorporate sound, have tactile elements, and have interactive parts that contrast with the game background should be selected. Interactive parts will be located from 500 to 900 mm (20 to 36 inches) high for forward or side reach from a wheelchair. Game panels not used as protective barriers to enclose platforms can provide space not less than 600 mm (24 inches) high, 600 mm (24 inches) deep, and 750 mm (30 inches) wide that will allow a wheelchair to roll under for access.

e. Maintenance Level. The level of maintenance required for this play equipment is moderate.

10-21. Horizontal Ladder.

A horizontal ladder is a rung ladder suspended in a horizontal position between two platforms or vertical supports (fig 10-19). Using upper body strength, children hang from the rungs by their hands and travel from hand-to-hand across the ladder. This play event may be provided as freestanding equipment or be attached to a composite structure.

a. Recommended Ages. Horizontal ladders are recommended for children ages 4 to 12 years. This play event is not recommended for children under 4 years.

b. Safety Guidelines.

(1) *Rung Diameter* Climber rungs from 25 to 40 mm (0.95 to 1.55 inches) in diameter should be selected for ease of gripping.

(2) *Maximum Height.* The maximum height of horizontal ladders should be measured from the center of the grasping device to the safety surface. For 4- to 5-year-olds, a maximum equipment height of 1500 mm (60 inches) should be provided.

c. Use Zone. A minimum 2400 mm (96-inch) use zone from all sides of the equipment will be provided.

d. Adaptations for Children With Disabilities. For wheelchair users, a maximum equipment height of 1400 mm (54 inches) should be provided.

e. Maintenance Level. The level of maintenance required for this play equipment is low.

10-22. Parallel Bars.

Parallel bars are metal bars attached to vertical supports at a height that allows children to lift the body with the arms and hand-walk the length of the structure (fig 10-20). The bars may be provided as freestanding equipment or be attached to a composite structure.

a. Recommended Ages. Parallel bars are recommended for children ages 5 to 12 years.

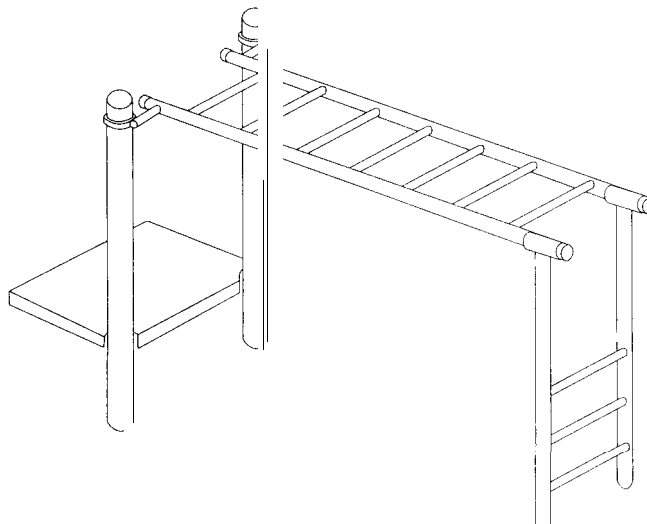
b. Safety Guidelines.

(1) *Maximum Bar Height.* A maximum bar height of 900 mm (36 inches) will be provided.

(2) *Pole Diameter* Parallel bars with a pole diameter between 50 and 60 mm (1-7/8 and 2-1/2 inches) will be selected.

c. Use Zone. A minimum 2400 mm (96-inch) use zone will be provided from all sides of the equipment.

d. Adaptations for Children With Disabilities. Bars may be lowered to make them accessible to children who use wheelchairs and have upper body strength.



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Figure 10-19. Horizontal Ladder.

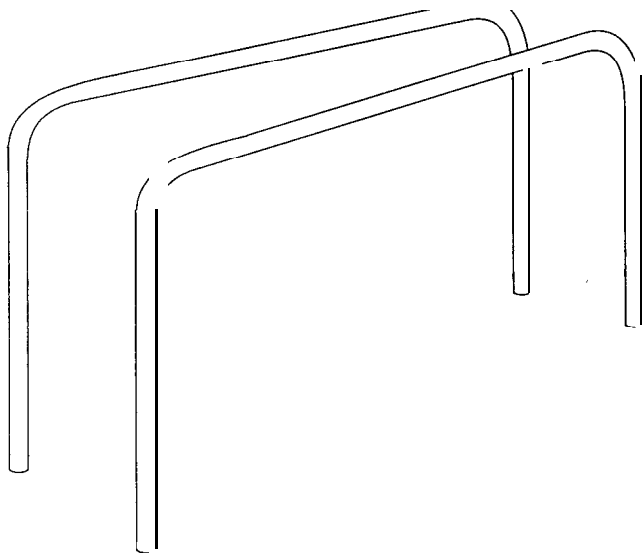


Figure 10-20. Parallel Bars.

e. Maintenance Level. The level of maintenance required for this play equipment is low.

10-23. Playhouse.

A playhouse is an enclosed structure designed primarily for dramatic play (fig 10-21). A variety of designs are available that may include roofs, windows, seating, table surfaces, store fronts, etc. A playhouse may have a climbable or nonclimbable design. The equipment may be freestanding. Playhouse-type components may also be attached to a composite structure.

a. Recommended Ages. Playhouses are recommended for children ages 12 months to 9 years. For 12 months to 4 years, freestanding playhouses with a nonclimbable design will be provided. For 5 years to 9 years, the freestanding playhouse may be climbable or nonclimbable.

b. Safety Guidelines.

(1) *Maximum Height of Freestanding Playhouse.* Freestanding playhouses with a maximum height of 1800 mm (72 inches) measured from the roof ridge to the safety surface will be provided.

(2) *Clear Sight Lines.* Clear sight lines into the playhouse will be provided from more than one location.

(3) *Multiple Entrances and Exits.* More than one entrance and exit will be provided.

c. Use Zone. A minimum 1800 mm (72-inch) use zone extending from all sides of the equipment will be provided. Two nonclimbable playhouses may have overlapping use zones.

d. Adaptations for Children With Disabilities. A minimum 800 mm (32-inch) wide entrance to accommodate wheelchairs should be provided. An in-

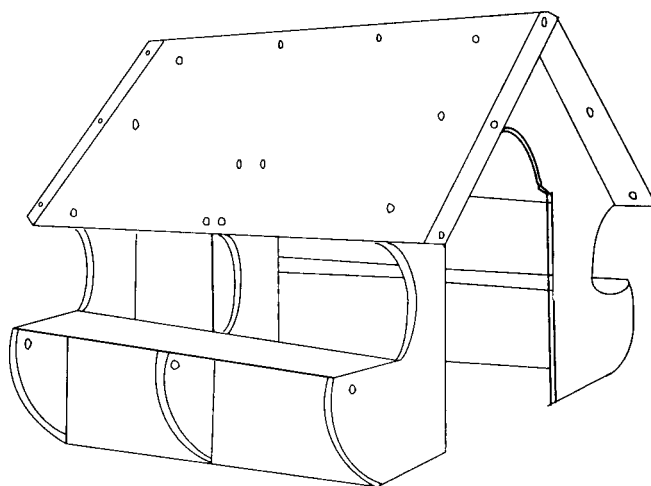


Figure 10-21. Playhouse.

terior turning space of 1500 mm (60 inches) in diameter is optimal, but not mandatory. All trip hazards will be eliminated at entrances and exits.

e. Maintenance Level. The level of maintenance required for this play equipment is low.

10-24. Ring Trek.

A ring trek is an upper body event that consists of a series of rings suspended from a horizontal support (fig 10-22). To use the equipment, the child hangs from the rings supported by the hands and travels hand-to-hand across the series of rings. This play event may be provided as freestanding equipment or be attached to a composite structure.

a. Recommended Ages. Ring treks are recommended for children ages 5 to 12 years.

b. Safety Guidelines. Takeoff/landing structures for the play event will be provided at a maximum height of 450 mm (18 inches).

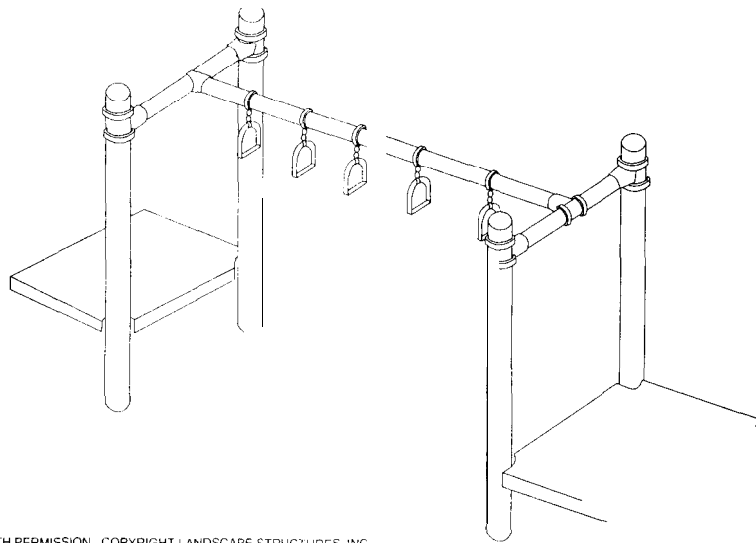
c. Use Zone. A minimum 2400 mm (96-inch) use zone will be provided from all sides of the equipment.

d. Adaptations for Children With Disabilities. This activity is not readily accessible to children with mobility limitations because of strength and recovery requirements. Children with visual limitations may need assistance in recovery and dismounting.

e. Maintenance Level. The level of maintenance required for this play equipment is moderate.

10-25. Sand Table.

A sand table is a raised, shallow tray that maybe filled with sand for manipulative play (fig 10-23). It may be used from a standing or sitting position. Sand tables may be provided as freestanding equipment or be attached to a composite structure.



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Figure 10-22. Ring Trek.

a. Recommended Ages. Sand tables are recommended for children ages 12 months to 9 years.

b. Safety Guidelines. A hinged table cover will not be provided. Hinged designs may fall onto a child's head, neck, fingers, or other body parts, causing injury or death.

c. Use Zone. A minimum 1800 mm (72-inch) use zone will be provided from all sides of the equipment.

d. Adaptations for Children With Disabilities.

(1) *Ages to 12 Years.* For wheelchair use, the playing surface should not be greater than 750 to 850 mm (30 to 34 inches) high, with a forward reach and side reach of 500 to 900 mm (20 to 36 inches) (fig 10-24). A clear ground space 900 mm by 1400

mm (36 inches by 55 inches) should be provided for a wheelchair. A minimum clear knee space of 600 mm (24 inches) deep and 750 mm (30 inches) wide should be provided.

(2) *Ages 18 Months to 5 Years.* A playing surface at a height of 550 mm (22 inches) should be provided for side reach. This height also permits young children to reach the equipment from a standing position.

e. Maintenance Level. The level of maintenance required for this play equipment is high.

10-26. Slide.

A slide is a gently sloped plastic or metal surface that serves as an equipment egress from an elevated platform (fig 10-25). Slides that are attached to composite structures are preferred. Freestanding slides may be provided.

a. Recommended Ages. Slides are recommended for children ages 2 to 12 years. More challenging slides, such as curved or tunnel slides, are recommended for children ages 3 to 12 years. Roller slides are not recommended.

b. Safety Guidelines.

(1) *Metal Slides.* Metal slides should be oriented in a northerly direction.

(2) *Clear Sight Lines.* Clear sight lines will be provided from the top to the bottom of the slide.

(3) *Entanglement.* Slides constructed with a smooth, continuous sliding surface with no gaps or spaces that may cause entanglement should be selected.

(4) *Maximum Height of Slide Entrance.* For 2-year-olds, slides with a maximum slide entrance height of 900 mm (36 inches) should be selected. For

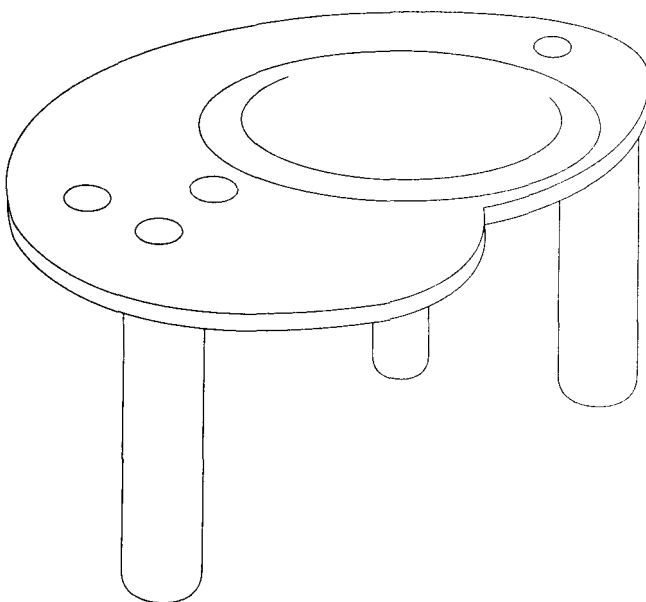


Figure 10-23. Sand Table

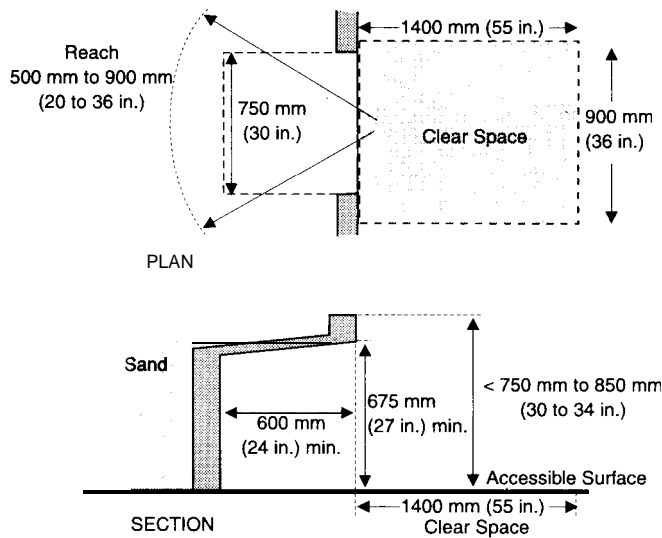


Figure 10-24. Accessible Sand Table

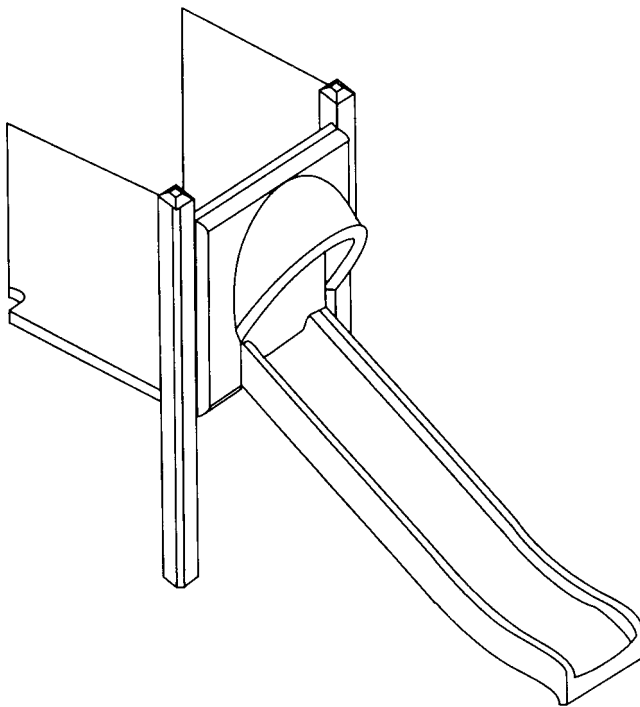


Figure 10-25. Slide

children ages 2 to 5 years, slides with a maximum slide entrance height of 1200 mm (48 inches) should be selected. For children ages 5 to 12 years, a maximum slide entrance height of 1400 mm (56 inches) should be provided.

(5) *Protective Barriers.* If the slide chute is not as wide as the connecting platform, protective barriers will be provided to enclose the platform at both sides of the slide chute.

(6) *Shale Chute Sidewalls.* For slides with circular or semicircular cross-sections, verification should be obtained from the slide manufacturer

that the equipment meets the requirements of ASTM F 1487 for minimum vertical sidewall height.

(7) *Lateral Discharge.* For all slides with a curved cross-section, verification should be obtained from the manufacturer that the slide design minimizes the likelihood of lateral discharge.

c. *Use Zone.* The slide use zone consists of three parts: the area around slide entrance steps or platform; the area to each side of the slide bed; and the area in front of the slide exit (fig 10-26).

(1) *Slide Entry Steps and Platforms.* For children ages 2 through 12 years, a minimum 2400 mm (96-inch) use zone will be provided from all sides of the steps or platform.

(2) *Slide Bed.* A minimum 1800 mm (72-inch) use zone will be provided on each side of the slide bed.

(3) *Slide Exit.* The length of the use zone in front of the slide exit will equal the height of the highest point of the sliding surface plus 1200 mm (48 inches) (fig 10-26). A minimum use zone length of 1800 mm (72 inches) and a maximum length of 4.3 m (14 feet) measured from the point where the slide slope decreases to less than 5° from the horizontal will be provided. If the point where the slope of the slide decreases to less than 5° cannot be determined, the use zone should be measured from the end of the slide exit.

d. *Adaptations for Children With Disabilities.* When attached to a composite structure, at least one slide should be accessible via a transfer point or ramp. Upper body strength is required to maintain a sitting posture. Slides may be usable by children who walk with assistive devices. The 100 mm (4-inch) slide sidewall makes transferring from a slide to a wheelchair difficult.

e. *Maintenance Level.* The level of maintenance required for this play equipment is moderate.

10-27. Spring Rocking Equipment.

Spring rocking equipment is a freestanding play event that consists of a seat attached to a spring (fig 10-27). The seat is often designed as a seesaw, animal, or vehicle. This equipment allows young children to experience motion and movement.

a. *Recommended Ages.* Spring rocking equipment is recommended for children ages 2 to 5 years. Rocking or springing equipment intended for standing will not be provided.

b. *Safety Guidelines.* The attachment area of heavy duty coil springs to the body of rocking equipment is exempt from pinch, crush, and shear point requirements.

c. *Use Zone.* A minimum 1800 mm (72-inch) use zone will be provided from all directions of the equipment. When two rocking structures have a

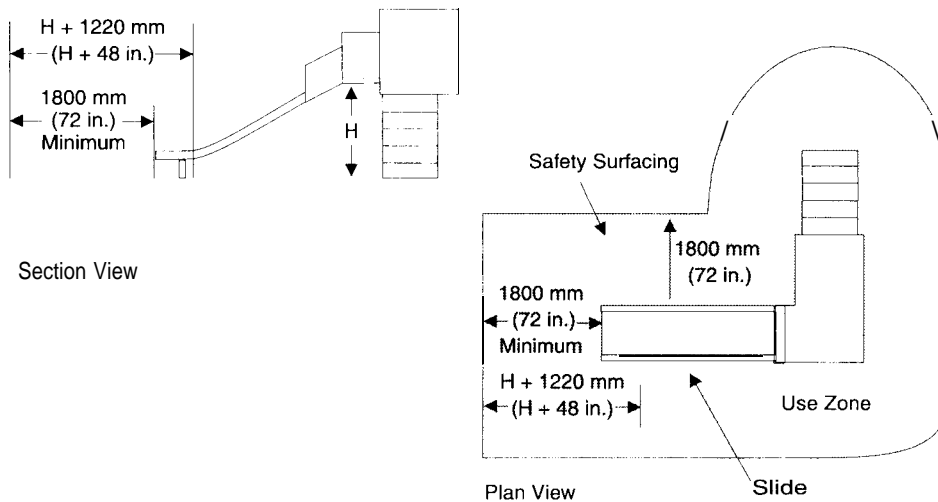
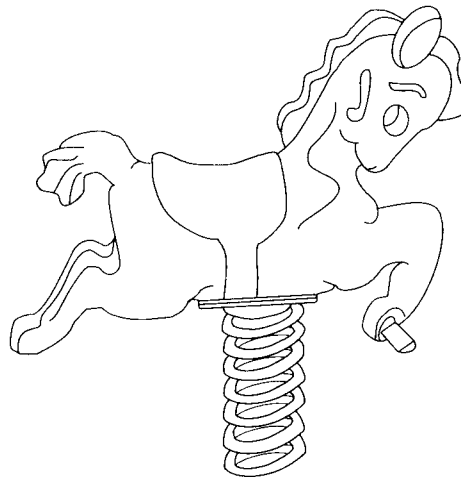


Figure 10-26. Slide Use Zone.



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Figure 10-27. Spring Rocking Equipment

seat height of 750 mm (30 inches) or less and are located adjacent to each other, the rocking equipment use zones may overlap.

d. Adaptations for Children With Disabilities. Seats with back support and seat belts may be provided for children who have difficulty maintaining a sitting posture.

e. Maintenance Level. The level of maintenance required for this play equipment is moderate.

10-28. Stationary Bridge.

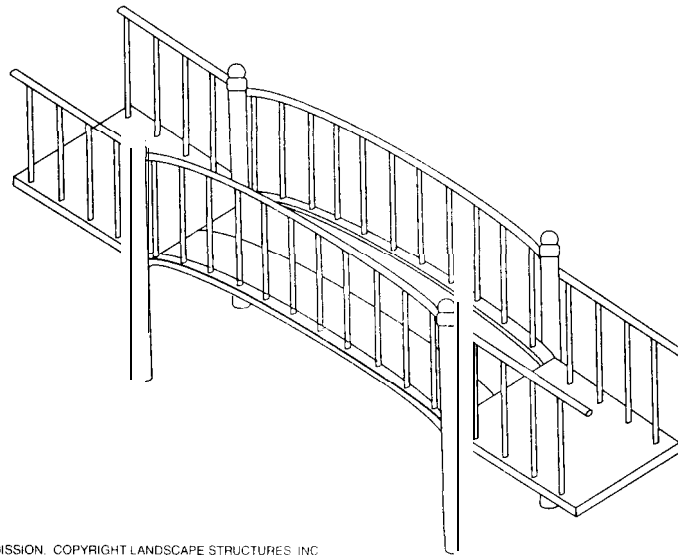
A stationary bridge may be designed as freestanding equipment or as a play event attached to a composite structure. It is a platform that connects two areas of land or two composite structure platforms (fig 10-28).

a. Recommended Ages. The stationary bridge is recommended for children of all ages.

b. Safety Guidelines.

(1) *Maximum height to bridge surface.* For children 12 months and under, a fully enclosed bridge with no potential for entrapment or falls to the surface will be provided. For children 12 months to 2 years, the bridge will be located at a maximum height of 900 mm (36 inches) to the bridge surface. For children ages 2 to 5 years, the bridge will be located at a maximum 1200 mm (48-inch) height to the bridge surface. For children 5 to 12 years, bridges with a maximum height of 1400 mm (56 inches) will be selected.

(2) *Bridge Surface.* A surface design that does not accumulate water or debris will be selected.



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Figure 10-28. Stationary Bridge.

Surface materials that will not cut, scratch, or burn when children crawl or slide on the surface will be selected.

c. Use Zone. For infant to 2 years, a minimum 1800 mm (72-inch) use zone will be provided from all sides of the equipment. For children ages 2 through 12 years, a minimum 2400 mm (96-inch) use zone will be provided from all sides of the equipment.

d. Adaptations for Children With Disabilities. The bridge may be designed to accommodate wheelchairs. Handrails and landings on accessible bridges should meet guidelines for ramps for wheelchair use. A minimum width of 900 mm (36 inches) will be provided for accessible bridges.

e. Maintenance Level. The level of maintenance required for this play equipment is low.

(2) *Location.* To-fro swings should be located at the edge of the play area, away from other play structures and circulation areas.

(3) *Number and Type of Swing Seats Per Bay.* Tot swings and belt swings will be hung from separate swing supports or in separate swing bay sections.

(4) *Swing Seats.* Rubber belt-type swing seats and tot seats will be provided. Tot seats that provide 360° support and are free from head and neck entrapments will be selected.

(5) *Swing Seat Height.* The minimum vertical height of swing seats will be measured from the underside of the occupied seat to the safety surface. For tot swing seats, the seats will be located at a minimum vertical height of 600 mm (24 inches). For 2 to 5-year-olds, a minimum vertical swing seat

10-29. Swing—to-Fro (Single Axis) Swing.

A to-fro swing frame includes seats that are suspended from chains or cables (fig 10-29). The swing seats move front-to-back along an arc in a single vertical plane. To-fro swings will be installed as freestanding equipment. The swings will not be attached to a composite structure.

a. Recommended Ages. Swings are recommended for children ages 6 months to 12 years.

b. Safety Guidelines.

(1) *Maximum Height of the Swing Crossbeam.* For children ages 6 months to 3 years, a swing crossbeam with a maximum height of 2100 mm (84 inches) will be provided. For children 3 through 12 years, a maximum crossbeam height of 2400 mm (96 inches) will be provided.

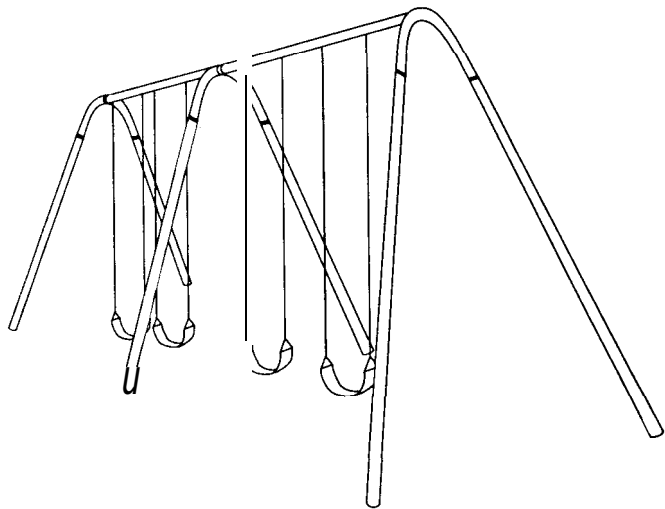


Figure 10-29. To-Fro Swing

height of 300 to 450 mm (12 to 18 inches) will be provided. For 5- to 12-year-olds, swing seats will be located at a minimum vertical height of 450 mm (18 inches).

(6) *Chairs.* PVC-coated chains may reduce pinching and may be selected at the designer's option.

c. Use Zone. A use zone equal to two times the height of the swing pivot point will be provided. The use zone extends both in front of and to the rear of the suspending beam for a width at least as wide as the beam (fig 10-30). Also, a 1800 mm (72-inch) use zone will be provided on both sides of the swing support structure. When two swings are located adjacent to each other, the swings may share the 1800 mm (72-inch) use zone at the side.

d. Adaptations for Children With Disabilities. Swinging requires upper body strength and the ability to maintain a sitting position.

(1) *Swing Seats.* Swinging platforms for wheelchairs ("wheelchair swings") or hard seats should not be provided because of potential impact hazards. A commercially available hammock-type swing seat with seat belts may be attached to a standard swing and used to provide back support.

(2) *Tactile Warning.* As a tactile warning, a distinct difference in texture between the swing use zone and the surrounding area is recommended.

(3) *Swing Use Zone.* Accessibility guidelines for the swing use zone are illustrated in figure 10-31. Access will be provided for transferring onto the swing and for pushing. One swing in each grouping of swings will have a use zone covered with accessible safety surfacing. A firm, stable, slip-resistant, and resilient surface a minimum 1500 mm (60 inches) wide will be provided under the full arch of

the swing. This provides two turnaround spaces, with a minimum diameter of 1500 mm (60 inches), along the route of the swing. One turnaround space will be provided for transferring onto the swing seat. The second turnaround space will be provided for pushing the swing. The surface will extend 100 mm (4 inches) beyond the maximum extension of the swing arch. A 750 mm by 1200 mm (30-inch by 48-inch) parking space will be provided for a wheelchair outside of the swing seat use zone.

e. Maintenance Level. The level of maintenance required for this play equipment is high.

10-30. Swing—Rotating (Multiple Axis or Tire) Swing.

A rotating swing frame includes seats that are suspended from chains or cables (fig 10-32). The swing seat moves about in more than one plane and spins around on its axis. Rotating swings will be installed as freestanding equipment. Rotating swings will not be attached to a composite structure.

a. Recommended Ages. Rotating swings are recommended for children ages 3 to 12 years.

b. Safety Guidelines.

(1) *Maximum Crossbeam Height.* A maximum swing crossbeam height of 2400 mm (96 inches) will be provided.

(2) *Location.* Rotating swings should be located at the edge of the play area, away from other play structures and circulation areas.

(3) *Number of Swings Per Bay.* Equipment use zones for rotating swings will not overlap. Rotating swings and to-fro swings will not be hung from the same support structure.

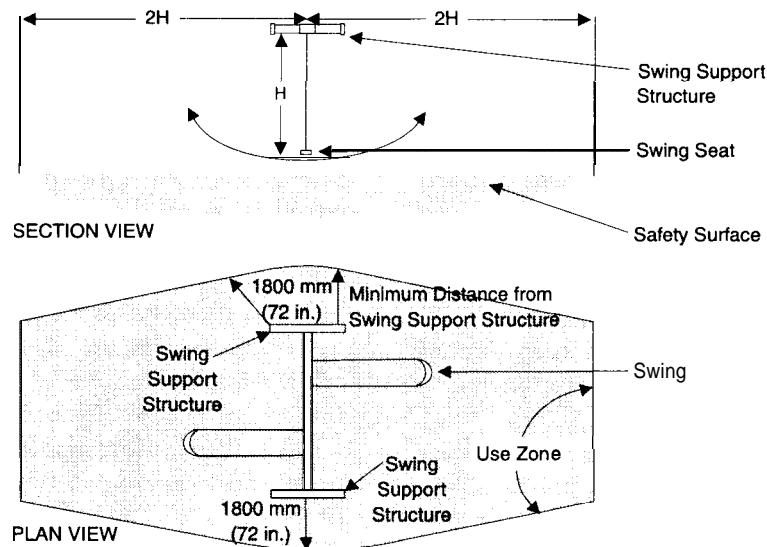


Figure 10-30. Swing Use Zone

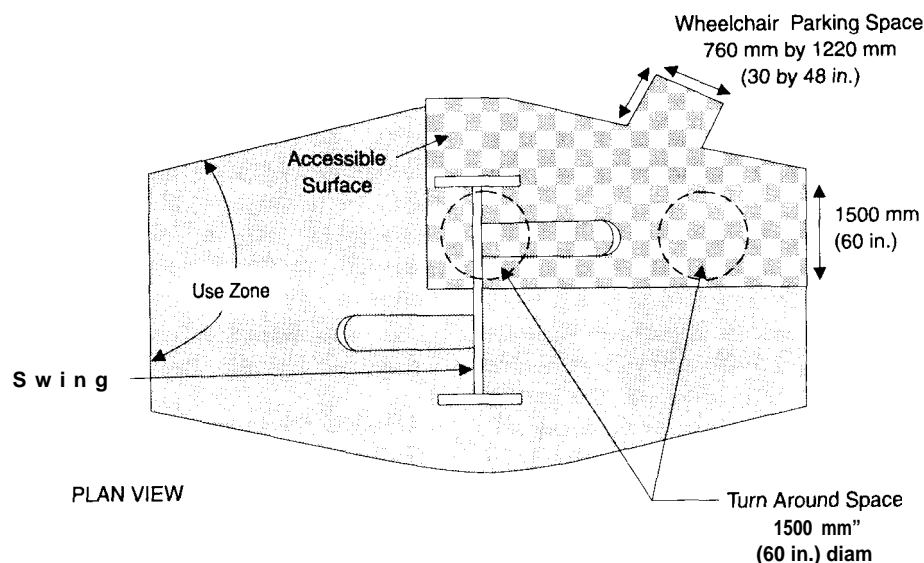
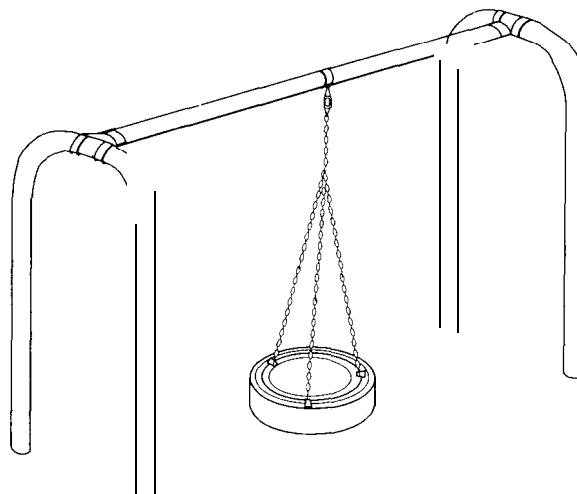


Figure 10-31. To-Fro Swing Use Zone Accessibility Guidelines



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Figure 10-42 Rotating Swing.

(4) *Swing Seats.* Rotationally molded swing seats with no openings should be provided, to avoid collecting water and prevent insect nesting. Smoothly finished seats with blunt or rounded edges should be provided. New or recycled automobile tires should not be used as swing seats.

(5) *Chains.* PVC-coated chains may reduce pinching and may be selected at the designer's option.

c. Use Zone. A use zone that equals the vertical distance between the pivot point and the top of the swing seat plus 1800 mm (72 inches) will be provided (fig 10-33) This use zone extends in all directions when measured from the swing seat. A minimum 1800 mm (72 inch) use zone extending in all

directions from the swing support structure will be provided. When two rotating swings are located adjacent to each other, the swing support structures may share the 1800 mm (72-inch) use zone at the side.

d. Adaptations for Children With Disabilities,

(1) *Swing Seats.* Webbing or rubber may be attached to the bottom of the swing to help support children who have difficulty in sitting.

(2) *Tactile Warning.* As a tactile warning, a distinct difference in texture between the swing use zone and the surrounding area is recommended.

(3) *Rotating Swing Use Zone.* One swing in each group of swings will be accessible. An accessible path of travel up to the swing for transferring

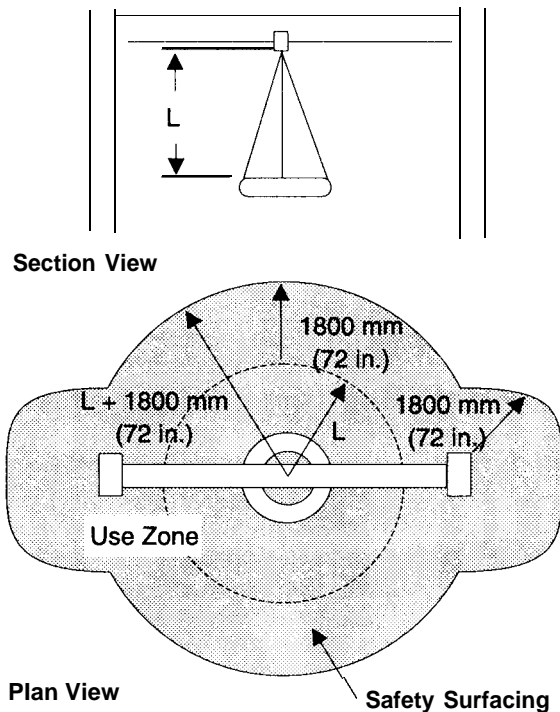


Figure 10-33. Rotating Swing Use Zone.

onto it and for pushing will be provided. A continuous, firm, stable, and slip-resistant, safety surface will be provided throughout the swing use zone.

e. Maintenance Level. The level of maintenance required for this play equipment is high.

10-31. Track Ride.

A track ride is an upper body event that consists of a handgrip attached to a vertical support with ball bearings or other moving connectors (fig 10-34). To use the equipment, the child's weight is supported by the hands and arms. This weight,

along with the motion of the child's body, propels the track ride across the vertical support. The play event may be provided as freestanding equipment or may be attached to a composite structure.

a. Recommended Ages. Track rides are recommended for children ages 5 to 12 years. Track rides are not recommended for children under 5 years.

b. Safety Guidelines. The track ride slope should meet manufacturers' recommendations.

c. Use Zone. A minimum 2400 mm (96-inch) use zone from all sides of the equipment will be provided.

d. Adaptations for Children With Disabilities. This activity is not readily accessible to children with mobility limitations because of strength and recovery requirements. Children with visual limitations may need assistance in recovery and dismounting.

e. Maintenance Level. The level of maintenance required for this play equipment is high.

10-32. Tunnel.

A tunnel is an enclosed passage designed to be crawled through by a child (fig 10-35). Tunnels may be freestanding equipment or may be attached to a composite structure.

a. Recommended Ages. Tunnels are recommended for children ages 6 months to 12 years.

b. Safety Guidelines. For children ages 6 months to 12 months, the tunnel should be located at safety surfacing level with no potential fall. For children ages 12 months to 2 years, the tunnel may be attached to platforms with a maximum height of 900 mm (36 inches). For children 2 to 5 years, the tunnel may be attached to platforms with a maximum height of 1200 mm (48 inches). For children 5 to 12 years, the maximum height of attached platforms will be 1400 mm (56 inches).

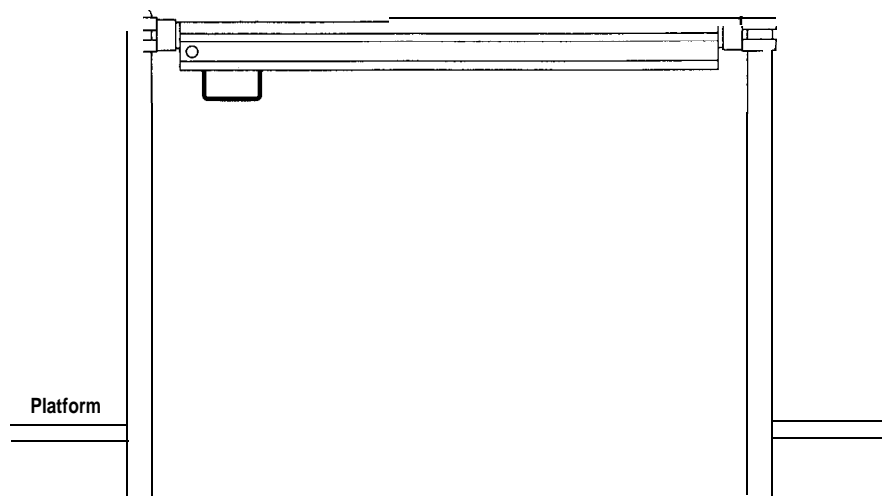
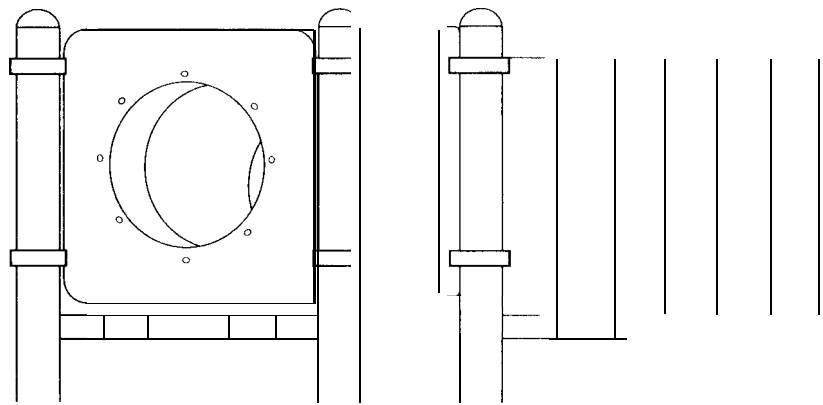


Figure 10-34. Track Ride.



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Figure 10-35. Tunnel.

- c. *Use Zone.* For infant to 2 years, a minimum 1800 mm (72-inch) use zone will be provided from all sides of the equipment. For children ages 2 through 12 years, a minimum 2400 mm (96-inch) use zone will be provided from all sides of the equipment.
- d. *Adaptations for Children With Disabilities.* Tunnels provide crawling experiences for children with limited mobility at ground level or as part of a composite structure.
- e. *Maintenance Level.* The level of maintenance required for this play equipment is moderate.

10-33. Play Events Which are not Appropriate.

Play events which are not appropriate for unsupervised children's outdoor play areas are listed in table 10-2.

10-34. Composite Structure.

Specific design guidelines apply when two or more play events are combined to form a composite structure.

- a. *Recommended Ages.* Composite structures are recommended for children ages 12 months to 12 years.
- b. *Safety Guidelines.*

- (1) *Applicable Safety Guidelines.* Composite structures will comply with general safety guidelines for children's outdoor play areas. In addition, safety guidelines that apply to all manufactured equipment and guidelines for individual play events that comprise the structure should be followed. Play events that are appropriate for the intended age group will be selected.
- (2) *Maximum Platform Height.* For children ages 12 months to 2 years, a maximum platform

Table 10-2. Inappropriate Play Events for Unsupervised Play Areas.

Inappropriate Play Events
Animal figure swings
Chain walks
Chain or tire climbers
Fulcrum seesaws
Log roles
May poles
Merry-go-rounds
Multiple occupancy swings other than tire swings
Rope swings
Rotating equipment
Swinging exercise rings
Trapeze bars
Whirls

height of 900 mm (36 inches) will be provided. For 2- to 5-year-olds, a maximum platform height of 1200 mm (48 inches) will be provided. For 5- to 12-year-olds, the platform will have a maximum height of 1400 mm (56 inches).

- c. *Use Zone.* A use zone for composite equipment equal to the use zones recommended for all individual play events that comprise the structure should be provided. The designers will evaluate the design of modular composite play equipment prior to purchase and installation. Guidance will be obtained from the installation safety manager and the manufacturer.

(1) *Side-by-Side Play Events.* Hazards created by conflicts in circulation and/or use patterns should be eliminated. Two play events will not extend from the same side of a composite play structure to create side-by-side play events (fig 10-36).

(2) *Recommended Layouts.* Recommended composite structure layouts for children ages 12 to 24 months, 2 to 5 years, and 5 to 12 years are provided (fig 10-37 through 10-39). These layouts are provided because manufactured play equipment catalogs include layouts that do not meet play program requirements of the installation. Catalogue layouts may also include play events that are not recommended for children's outdoor play areas. It is recommended that the designer use the recommended composite structure layouts to develop bid documents.

d. Adaptations for Children With Disabilities. Guidelines for accessible routes, ramps for wheelchair access, transfer points, wheelchair-accessible platforms, and accessible stepped platforms will be followed when designing composite structures. Equipment entrances and exits may be marked with a change in texture on the rail and/or floor as a tactile warning. Play events with high potential for use by children with disabilities should be selected. These play events will be similar to the nonaccessible play events. An accessible path of travel will be provided to accessible composite structure play events that are located on the ground plane.

(1) *Small Play Structures.* Small play structures with less than 12 elevated play events are not

required to have a ramp. A transfer system that provides access to a minimum of one-half of the elevated play events will be provided. Where a sliding experience is included, the transfer system will provide access to at least one slide.

(2) *Large Play Structures.* In large play structures with 12 or more elevated play events, a ramp will be provided to access a minimum of one-half of the play events. In addition, a transfer system will be provided to access a minimum of one-half of the play events. Some play events may be accessed both by ramp and by the transfer system. When a sliding experience is provided, at least one slide will be accessible by ramp. Accessible play events will be similar to inaccessible play events. The designer will choose those play events which will be accessed by a ramp and/or a transfer point.

e. Maintenance Level. The level of maintenance required for this play equipment is moderate.

10-35. Play Events Not Included in the Manual.

Manufacturers are continuously developing new products and play events. The designer should first determine if these play events meet the installation play area program requirements. If so, the designer should consult the U.S. Consumer Product Safety Commission's *Handbook for Public Playground Safety* and ASTM F 1487 to determine the child safety requirements for this event.

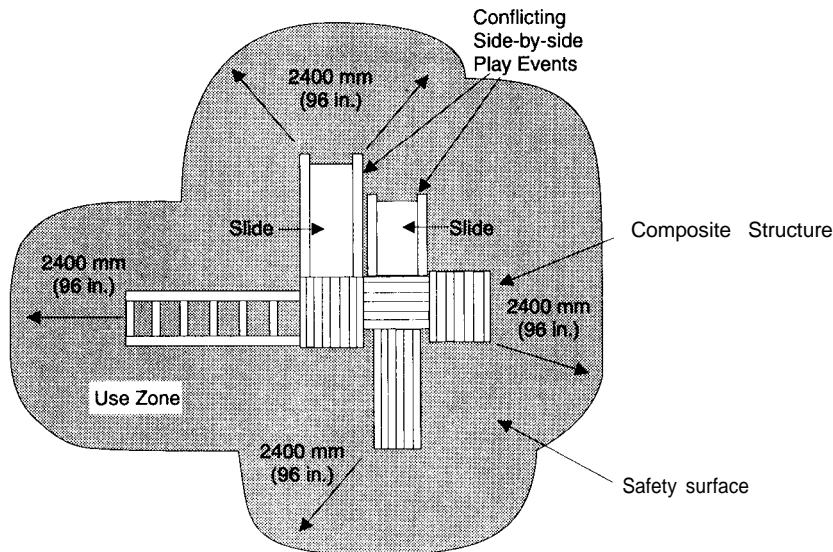
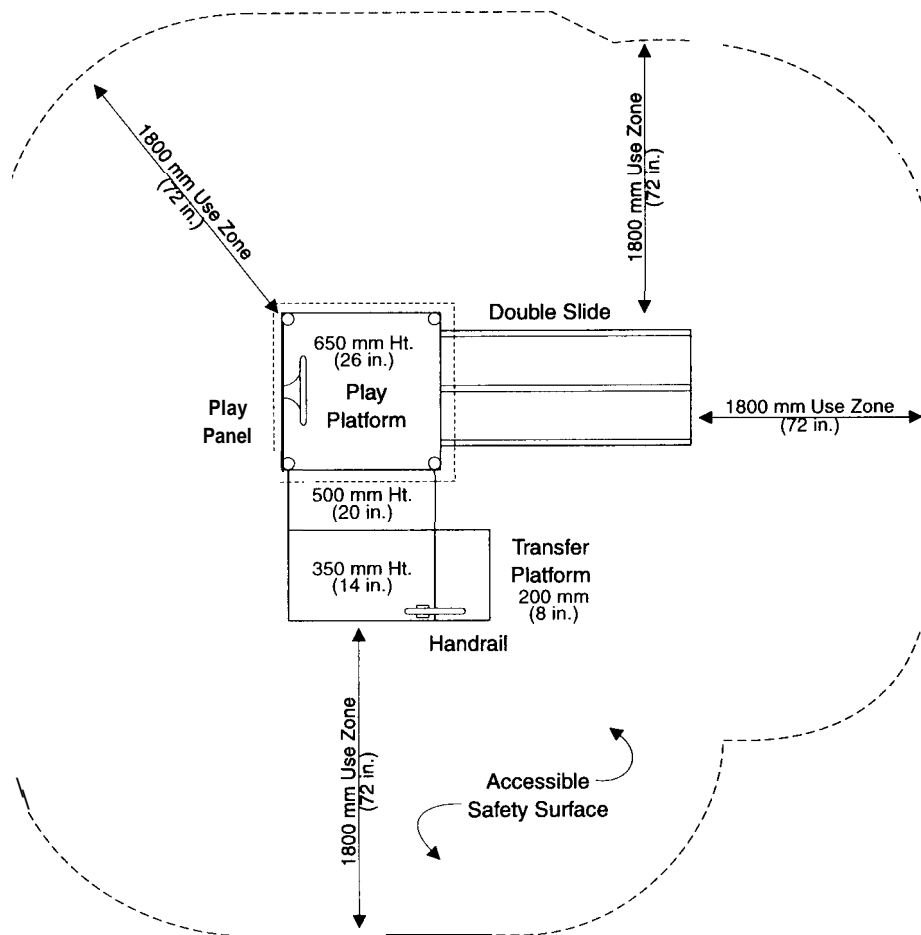
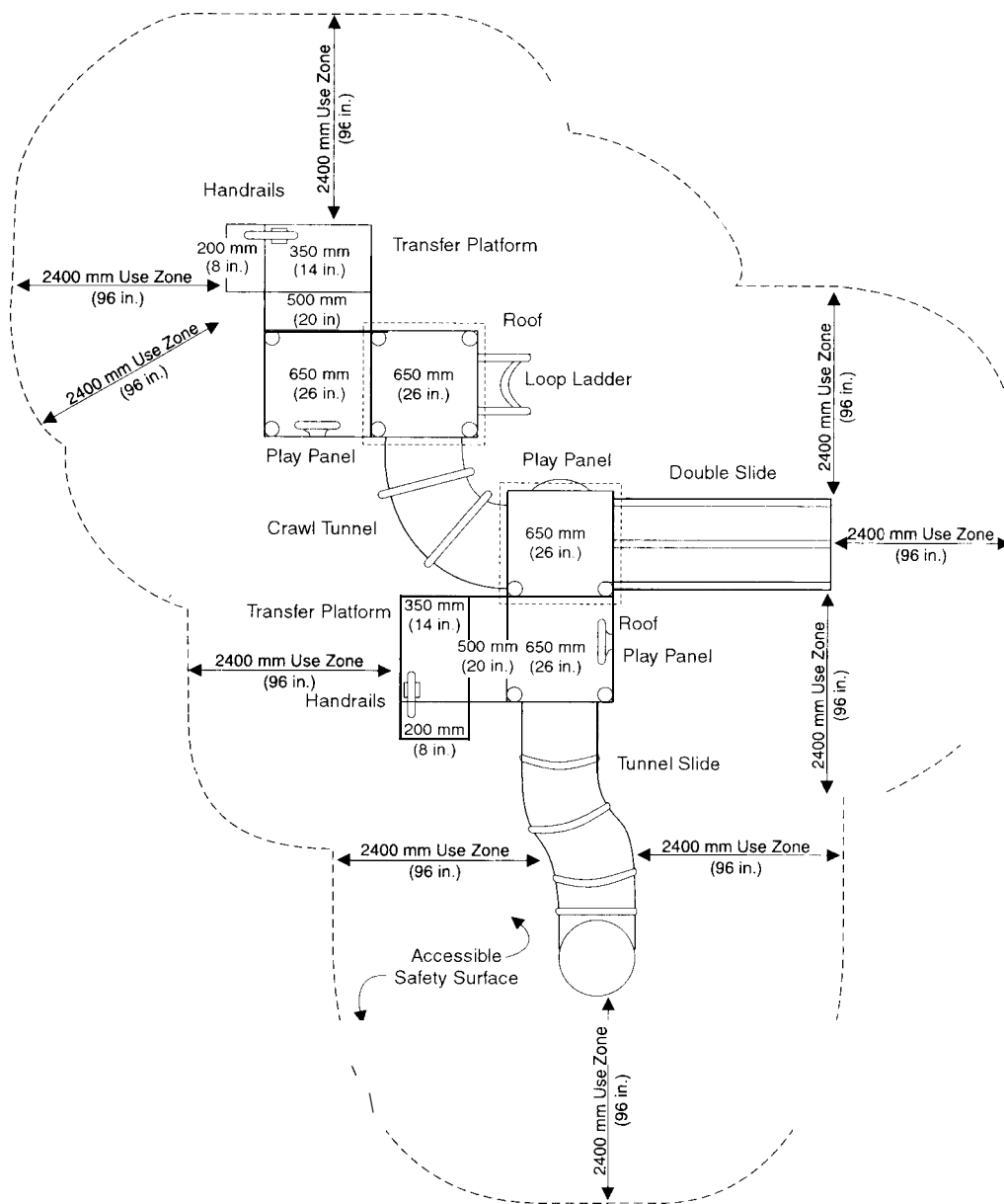


Figure 10-36. Composite Play Equipment With Side-by-Side Events



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Figure 10-37. Composite Structure (12 to 24 Months).



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Figure 10-38. Composite Structure (2 to 5 Years).

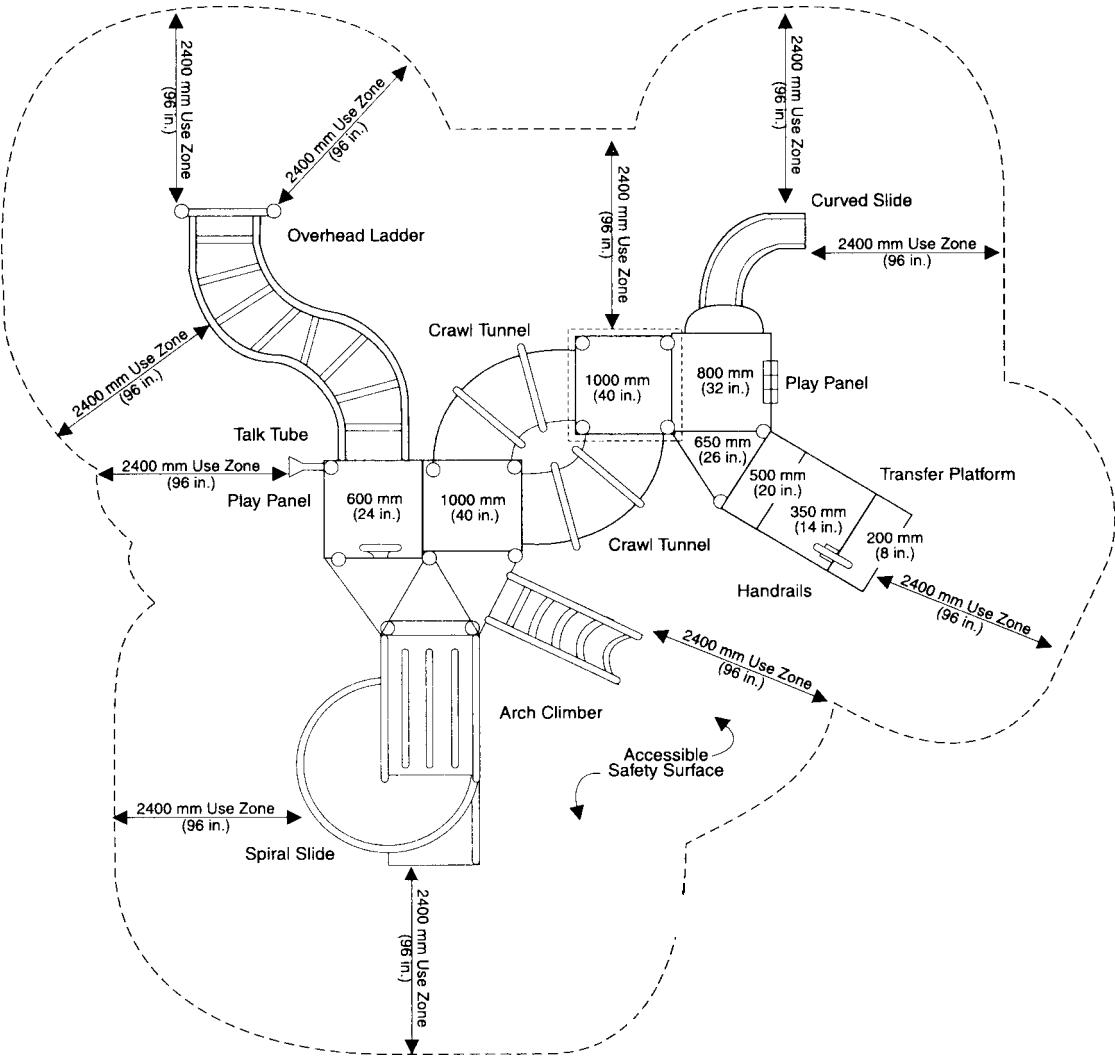


Figure 10-39. Composite Structure (5 to 12 Years)